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ABSTRACT

The IPAT Children's Personality Questionnaire was administered to two samples of white, middle-class, suburban school children. Both samples were divided into well-adjusted and maladjusted subgroups on the basis of teacher ratings. The CPQ Neuroticism score and the teacher ratings of adjustment status yielded biserial correlations of .12 and .22, while the biserial correlations of teacher ratings and IQ scores were -.52 and -.50, with higher IQ scores being associated with healthier (but numerically lower) teacher ratings. The findings were discussed in terms of the practical implications for the screening of school children for emotional dysfunction and in terms of the implications for the validity of the CPQ Neuroticism index. (Author)

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Convergent Validity of the IPAT Children's Personality Questionnaire and Teachers' Ratings of the Adjustment of Elementary School Children

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Abstract

The IPAT Children's Personality Questionnaire was administered to two samples of white, middle-class, suburban school children. Both samples were divided into well-adjusted and maladjusted subgroups on the basis of teacher ratings. The CPQ Neuroticism score and the teacher ratings of adjustment status yielded biserial correlations of .12 and .22, while the biserial correlations of teacher ratings and IQ scores were -.52 and -.50, with higher IQ scores being associated with healthier (but numerically lower) teacher ratings. The findings were discussed in terms of the practical implications for the screening of school children for emotional dysfunction and in terms of the implications for the validity of the CPQ Neuroticism index.

Convergent Validity of the IPAT Children's Personality Questionnaire and Teachers' Ratings of the Adjustment of Elementary School Children

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Recognition of the importance of providing help before maladaptive behavior patterns have become so deeply ingrained that they are irreversible has stimulated interest in screening elementary school children for academic and behavioral difficulties (Allinsmith & Goethals, 1962; Glavin & Quay, 1969; Liem, Yellot, Cowen, Trost, & Izzo, 1969; Morse, Finger, & Gilmore, 1968; Rhodes, 1968). However, establishing the validity of psychological tests as screening instruments is quite difficult, particularly if one attempts to apply the techniques of criterion-oriented validation (APA, 1954, p. 14). To assess the concurrent or predictive validity of a test requires that there be "acceptance of a set of operations as an adequate definition of whatever is to be measured (Bechtoldt, 1951, p. 1245)." That is, there must be a set of measures which, at least temporarily, can be assumed to have greater a priori validity for the concept being measured than the measures one wishes to use as a predictor.

In the case of mental health status, the diagnostic findings of mental health professionals have the highest a priori validity as a criterion measure. However, it is not economically or otherwise feasible to obtain clinical assessments of large school populations. Efforts have, therefore, been made to establish that the more readily obtainable teacher ratings of pupil adjustment are sufficiently highly correlated with clinical ratings to be considered as generally equivalent data. The long series of Wickman studies (Wickman, 1929; Mitchell, 1942; Stouffer, 1952; Beilin, 1959) traced persistent differences in the perspectives of teachers and clinicians

regarding the nature of psychological maladjustment. Beilin (1959) attributed these differences to the differing roles of teachers and clinicians, with teachers tending to be most sensitive to those pupil behaviors which interfere with successful performance of the teacher role. On the other hand, Domke reported that "teachers' opinions about the emotional state of the children agreed exactly with the opinion of mental health personnel in 86% of the cases (1963, p. 509)." Bower (1960) found that 87% of the pupils known to a child guidance clinic were rated by their teachers as among the most poorly adjusted in their class. Glidewell, Domke, and Kantor (1963) reported that teacher ratings and ratings made by psychiatric social workers on the basis of professional findings were within one point of each other on a four-point scale 92% of the time. Liem, Yellot, Cowen, Trost, and Izzo (1969) found that teachers' ratings of pupil maladjustment on three checklists yielded correlations of -.64 to -.71 with clinical ratings on a seven-point mental health continuum.

The purpose of the present research was to investigate the concurrent, diagnostic validity of the Institute for Personality and Ability Testing Children's Personality Questionnaire (CPQ), Form A, 1963 Edition. In view of the seeming preponderance of favorable data regarding the validity of teacher ratings of pupils' adjustment status, the research problem was specifically stated as an investigation of the extent to which the CPQ could differentiate between well-adjusted and maladjusted school children, with teacher referrals to mental health professionals and teacher ratings serving as dual criteria of mental health status.

Method

Subjects

Subjects for the validation study were 353 white fourth- through

eighth-graders attending the only grade school in an upper middle-class suburb located north of Chicago, Illinois. Subjects for the cross-validation study were 295 white sixth- and seventh-graders attending two junior high schools in a north Chicago suburb adjacent to the one providing subjects for the validation study. The selection of classes to be tested was done on the basis of teachers' willingness to cooperate in the research project.

Procedure

For the validation study, pupils were tested in May, 1968, in classroom groups. The 140-item IPAT Children's Personality Questionnaire, Form A, 1963 Edition, was administered as part of a battery of four tests of personality and creativity. IQ scores, derived mainly from the Lorge-Thorndike Intelligence Test, were obtained from school records. Teachers were asked to rate the adjustment level of each pupil by placing him or her in one of the following four categories: 1) Child is essentially normal and well adjusted; accepted by peers; works up to mental capacity 2) Child has chiefly inner personality problems such as feelings of inadequacy, inferiority, anxiety, or unhappiness; child is the one who suffers most from his or her problems 3) Child has chiefly conduct or behavior problems which cause discomfort, inconvenience, or harm to other people; e.g., child is delinquent, aggressive, destructive, steals, etc. 4) Child has other problems or a mixture of inner personality and conduct problems; e.g., child has low intelligence or learning problems; is hyperactive and distractible; has a severe speech defect; or has many physical complaints that seem related to being emotionally upset.

The files of the schools' department of special services were reviewed and referrals to the school counselor, the school social worker, and the

school psychologist within the preceding two years were matched against the list of pupils tested in the project. Since Lambert's (1968, p. 289) follow-up study had indicated that children rated as maladjusted by their teachers but not referred for help turned out to be just as disturbed as those actually referred for guidance services, in the present validation study, ratings and referrals for guidance services were used as a dual criterion of adjustment status. Either a rating of maladjustment by the current teacher (rating of 2, 3, or 4 on teacher rating scale) or a referral to the special services department within the past two years was sufficient for classification within the maladjusted group.

The boys included in the validation study were classified as follows: 96 well-adjusted and 76 maladjusted (45 both rated maladjusted and referred for help, 27 merely rated maladjusted, and 4 previously referred for help but not rated maladjusted by current teacher). The girls were classified as follows: 141 well-adjusted and 40 maladjusted (23 both rated maladjusted and referred for help, 16 merely rated maladjusted, and 1 previously referred for help but not rated maladjusted by current teacher).

The cross-validation sample was tested in November, 1969, and February, 1971. Again, Lorge-Thorndike IQ scores were obtained from school records. Teachers were asked to rate all pupils in their class on the same rating form used in the original validation study. Since data on referrals for special help were not available, the teacher ratings alone were used to classify the students on adjustment status. The boys were classified as: 107 well-adjusted and 45 maladjusted. The girls were classified as: 129 well-adjusted and 14 maladjusted. In spite of the use of referral data for only one of the two samples, the adjustment criterion was essentially teacher rating data for both samples. In the validation

sample, 348 of the 353 subjects were classified by the dual criterion of teacher ratings and referral data exactly as they would have been classified on the basis of teacher ratings alone.

Analysis of Data

All CPQ raw scores were converted to sten scores by means of the normative data in Tables N-1 and N-4 of the CPQ tabular supplement (Institute for Personality and Ability Testing, 1968). The Neuroticism score was computed by means of the formula indicated in the test manual (Porter & Cattell, 1968, p. 15). In order to dichotomize pupils on adjustment status as indexed by the Neuroticism score, scores of 7 or higher were classified as representing maladjustment, in accordance with the interpretive guidelines of Cattell and Cattell (1969, p. 20). Pupils were classified as well-adjusted or maladjusted on the basis of IQ scores merely by selecting separately for boys and girls in the validation sample that Lorge-Thorndike IQ score which provided optimal discrimination between teacher-rated well-adjusted and teacher-rated maladjusted individuals.

The third basis for categorizing students on adjustment status was discriminant scores obtained from the CPQ. Since a previous study by Lessing and Smouse (1967) had produced a different pattern of discriminant scores for boys and girls, in the present study discriminant scores were obtained separately for boys and girls. The CPQ factor sten scores were subjected to discriminant function analyses by means of a three-phase computer program based on formulas presented by Rao (1962, pp. 257, 318-319) and Kendall (1957, p. 163). In the first phase, the Mahalanobis D^2 statistic V was used as a chi square (with *df* equal to 14, the number of CPQ factors) to test whether the 14 CPQ factor means for the teacher-rated maladjusted pupils differed significantly from the means of the teacher-rated

well-adjusted pupils. The discriminant coefficients for all 14 factors for each of the two groups (well-adjusted and maladjusted) were then computed. Weights to be used as multipliers for each sten score were obtained by subtracting the coefficients of the well-adjusted group from the coefficients for the maladjusted group. The program then produced discriminant scores of a type that the percentage of correct identifications is equal for categories of subjects being differentiated.

The CPQ discriminant weights derived from the validation sample data were applied to the CPQ sten scores of the pupils in the cross-validation sample. Similarly, the same percentage cut-off point (but not necessarily the same IQ score) used to discriminate between teacher-rated well-adjusted and maladjusted individuals in the validation sample was then used as the basis for categorizing pupils in the cross-validation sample.

Results

Table 1 contains the CPQ sten scores on the 14 first-order factors and Neuroticism for the validation sample subdivided by sex and teacher rating of adjustment status. The patterns of factor score differences between the

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Insert Table 1 about here
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well-adjusted and the maladjusted subgroups was quite similar among boys and girls. In comparison with individuals rated as maladjusted, both boys and girls rated as well-adjusted scored significantly higher on sociability, intelligence, ego strength and emotional resiliency, and social poise and spontaneity (Factors A, B, C, and H) and significantly lower on social timidity, social shrewdness and opportunism, and apprehensiveness (Factors J, N, and O). Among girls only, individuals rated as well-adjusted scored significantly higher than the maladjusted on self-control and concern for

social standards (Factor Q_3). This association between teacher-rated good adjustment and the expression of socially conforming attitudes that are culturally normative for females may have occurred because fulfilling sex-role expectations is actually adaptive. Or, the association may be a further instance of the previously documented tendency for raters to perceive sex-stereotypic behavior as indicative of good mental health (Broverman, Broverman, Clarkson, Rosenkrantz, & Vogel, 1970, p. 4). In the case of both boys and girls, the CPQ summary pathology index, the Neuroticism score, significantly differentiated between individuals rated as well-adjusted by teachers and those rated as having notable psychopathology.

The discriminant function analysis yielded V statistics of 42.75 and 63.33 for boys and girls respectively ($df = 14$; $p < .01$). This evidence that, in the case of each sex, the 14 CPQ factor means considered together differed significantly for the teacher-rated maladjusted and well-adjusted subgroups justified the computation of discriminant scores. Table 2 contains the weights to be applied to CPQ sten scores and the constant to be added in order to obtain the discriminant scores designed to achieve

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Insert Table 2 about here
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maximum discrimination between adjustment status subgroups. In the case of the Lorge-Thorndike IQ scores, it was found that the best differentiation between teacher-rated adjustment subgroups in the validation sample was obtained by categorizing all boys in the lowest 43.8% of the range of IQ scores earned by boys in the sample as maladjusted. Among the girls, classifying the lowest 29.4% as maladjusted was optimal. The actual IQ scores corresponding to these cutting points were 115 for boys and 111 for girls in the validation sample. When the percentage cutting points were

applied to the cross-validation sample, the actual IQ scores representing the cutting points were 110 for boys and 108 for girls. Scores at or below the cutting point classified a pupil as maladjusted.

Table 3 presents the findings of the study in terms of the criterion-validation model with teacher ratings of adjustment status serving as a criterion, to which the Neuroticism score, discriminant score, and IQ were each attempting to predict. The most noteworthy aspect of the table is the

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Insert Table 3 about here
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fact that no predictor measure (neither CPQ Neuroticism score, CPQ discriminant score, nor Lorge-Thorndike IQ) did much better in differentiating teacher-rated adjustment groups than did a simple prediction derived from the base rate of maladjustment in the samples. In the validation sample, merely guessing that every pupil was rated well-adjusted would result in being right 67.1% of the time; the best predictor, the CPQ discriminant scores, could improve upon this percentage of correct identifications by only 6.8 points. In the cross-validation sample, with its lower percentage of teacher-rated maladjustment, no predictor could do better than simply guessing that each pupil was well-adjusted. The CPQ Neuroticism score attained a percentage of correct identifications that was similar to that obtainable by the base rate prediction by tending to categorize nearly all pupils as well-adjusted. In no subgroup of either sample were more than 20% of the pupils rated maladjusted by teachers also identified as disturbed by means of the Neuroticism index. The CPQ discriminant score succeeded in improving upon the accuracy of a base rate prediction in the validation sample and at the same time was able to screen out an appreciable proportion of the pupils rated as maladjusted. However, the IQ score from

a routinely administered group test performed quite as well and likewise screened out an appreciable proportion of the students rated as maladjusted by their teachers.

The finding that IQ scores identified teacher-rated maladjusted students more successfully than did personality test scores raised question as to whether the criterion-validation model could be appropriately applied to the data. Consequently, the data analysis was shifted to a construct validation model (Cronbach & Meehl, 1955) with mental health status designated as the construct believed to underly both teacher ratings of adjustment and selected scores on the CPQ (with neither variable assuming the status of criterion). The convergent and discriminant validation procedures of Campbell and Fiske (1959), which place test scores within a context of relationships relevant to their construct validity, were partially applicable to the data.

Table 4 contains a fragment of a multitrait-multimethod matrix (Campbell & Fiske, 1959, p. 85). The fragment includes three methods for one trait (mental health status) and one method for the second trait (intelligence) so that it is possible to present three values from the validity diagonal (monotrait-heteromethod) and three values from one heterotrait-heteromethod triangle (intelligence evaluated by one method versus mental health status evaluated by three methods). The monotrait-heteromethod correlations

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Insert Table 4 about here
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appearing in the upper half of Table 4 do not, as a group, surpass the heterotrait-heteromethod correlations in the bottom half of Table 4. The only pair of mental health indices that showed a moderately high relationship (CPQ discriminant scores and teacher ratings in the validation sample)

were little more related to each other than each was related to a measure of intelligence. In the cross-validation sample, their correlation dropped below the correlation of each with intelligence. The measure of mental health status that was most clearly discriminable from the measure of intelligence, namely the CPQ Neuroticism score, was only moderately correlated with the other two indices of mental health status.

One of the three categories combined to form the maladjusted classification of the dichotomized teacher ratings was a miscellaneous grouping including children with low intelligence or learning problems. (See the fourth category of teachers' rating scale as described under "Procedure" section.) Since intelligence test scores would be particularly relevant for the adjustment status of many of the pupils placed in this category, the correlations between teacher ratings, IQ, and CPQ Neuroticism were re-computed for the validation sample after the data for pupils judged to have "mixed or other problems" had been eliminated. The correlation between CPQ Neuroticism and teacher ratings of adjustment did not increase and teacher ratings of adjustment continued to be significantly correlated with IQ even when the teachers were discriminating between levels of adjustment in students who were not manifesting academic problems.

In a final attempt to maximize the correlation between the teacher ratings of adjustment and a predictor score derived from the CPQ, the basis of classification for the validation sample was changed from sex to type of disorder reported in the teacher ra' .gs (well-adjusted versus inner personality problem versus conduct or mixed problems). A new discriminant analysis was performed by means of a computer program whose resulting discriminant scores maximize the total percentage of correct identifications even if some categories are much better discriminated than others. The new

discriminant scores correctly identified only 73.8% of the total sample as compared with the 73.9% correctly identified by the original discriminant scores. Moreover, the highest percentage of correctly identified maladjusted pupils was 46.7% for pupils with conduct problems as compared with the 70% of maladjusted girls identified by the original discriminant scores.

Discussion

From a practical viewpoint, the implications of the findings are clear. If one wishes to differentiate between pupils who would be evaluated as well-adjusted by teachers and those who would be evaluated as maladjusted, the CPQ Neuroticism score and a special CPQ discriminant score based on local norms will provide 65-75% accuracy. The Neuroticism score will identify very few pupils who would be rated by teachers as disturbed, but is preferable if one wishes to minimize the misidentifications of well-adjusted students as disturbed. The discriminant score is preferable (when applied to comparable samples) if one wishes to maximize the identification of students who would be rated as maladjusted by their teachers even at the cost of misidentifying a fourth to a third of the teacher-rated normal students. However, the task of discriminating between groups differing in teacher-rated adjustment could be performed just as easily by a routinely administered group test of intelligence without the necessity of any complicated weighted scores.

The finding that a personality inventory has little advantage over an intelligence test in differentiating between teacher-rated adjustment subgroups is not a matter of there being something unusual or atypical in the sample of pupils and teachers studied. Semler (1960) obtained similar results although he did not discuss them in terms of this particular issue. He reported a median correlation of .34 between teacher ratings of adjustment

and pupils' scores on the Otis Intelligence Test as compared with a median correlation of .39 between teacher ratings of adjustment and pupils' scores on the California Test of Personality. The requirements of the teacher's role (see Beilin, 1959) make achievement-related personality patterns most salient, while the limitations upon the scope and intimacy of teacher-pupil interactions make it extremely difficult for teachers to be aware of the inner psychological world of their students. Ullman (1952, pp. 34, 39) suggested that this distance from the inner world of students made teachers more comfortable and accurate in rating externally manifest rather than intrapsychic disorders and accounted for the greater convergence among measures of adjustment status among boys than among girls. In the present study, however, the trend was toward greater congruence among teacher rating and test measures of adjustment among girls rather than among boys, as was the case in Semler's (1960) study. Semler's suggested explanation might have been operative in the current study also: Semler found greater congruence among teacher ratings and self-ratings of adjustment when rater and ratee were of the same sex, with female pupils thus being most often rated empathically since most teachers in the study were female.

The data of the study are inconclusive in regard to the construct validity of the CPQ Neuroticism and discriminant scores as measures of mental health status. Previous studies establishing significant relationships between the CPQ Neuroticism score and admission to a psychiatric clinic (Lessing & Smouse, 1967) and between teacher ratings and clinical assessments (Glidewell, Domke, & Kantor, 1963; Liem et al., 1969) established sufficiently great a priori validity for each as a measure of mental health status that their convergence could have enhanced the validity of both. However, the lack of convergence is ambiguous (see Krause, 1971).

Clearly, the CPQ Neuroticism scores and teacher ratings are measuring the same phenomenon to only a slight degree. But there are insufficient grounds for choosing between the following alternative propositions: 1) the CPQ Neuroticism scores and the teacher ratings are adequate and equally valid measures of different specific components of mental health status, 2) the teacher ratings are a fairly inadequate measure of mental health status as compared with the CPQ Neuroticism scores, and 3) the CPQ Neuroticism scores are a fairly inadequate measure of mental health status as compared with teacher ratings.

In support of the conclusion that the CPQ Neuroticism scores and the teacher ratings are equally valid measures of different components of mental health status, one notes 1) the previously cited evidence that each has been found to be significantly related to mental health status as evaluted clinically, and 2) the consistency of such an interpretation with theoretical construals of mental health as a multidimensional concept involving situational and role variables (Jahoda, 1958; Scott, 1958; Smith, 1961). In support of the second alternative conclusion that the teacher ratings are less valid than the CPQ Neuroticism scores, one notes that only the teacher ratings are subject to the validity-reducing implications of greater correlation with a measure of a different construct than with another measure of the same construct (APA, 1954, p. 17; Campbell & Fiske, 1959, p. 84). There is, of course, some basis for questioning whether the higher correlation of teacher ratings with IQ scores than with Neuroticism scores really represents higher correlation with an index of a concept other than mental health. Jahoda's multidimensional concept of mental health includes an intellectual component under the rubrics of adequate perception of reality and environmental mastery (1958, p. 23). Psychoanalytically-oriented

theorists have conceptualized intelligence and judgment as aspects of ego adequacy, which in turn is conceptualized as a partial criterion of mental health (Fenichel, 1945, pp. 33-53; Bellak, Hurvich, & Crawford, 1970). However, in Loevinger's (1966, p. 195) words, "intellectual development is not a fair measure of ego development, even though exercise of intelligence is an ego function." Intelligence and mental health status are differentiatable concepts even when the latter is viewed largely in terms of ego adequacy, since intelligence is only one of a large number of ego functions. Therefore, one cannot discount the negative validity implications of the higher correlation between teacher ratings and IQ than between teacher ratings and personality test scores.

It is possible that the heavy confounding of intellectual and personality evaluation in the teacher ratings is partly a function of methodology. Datta, Schaefer, and Davis (1968) obtained teacher ratings of pupil adjustment that were uncorrelated with aptitude scores in three out of four subgroups when teachers rated only five students each rather than rating an entire classroom. A less demanding rating task may permit a more differentiated, individualized view of each pupil being rated and decrease teachers' susceptibility to a halo effect determined mainly by a pupil's amenability to school roles and routines. Eysenck and Pickup's (1968) finding that the Neuroticism score of the Junior Eysenck Personality Inventory correlated very little with teacher ratings of emotional stability, while the latter correlated moderately highly with teacher ratings of cooperativeness in school adds further weight to the argument that teacher ratings of the adjustment of classroom groups of children are subject to certain validity-reducing factors that have less effect on personality tests.

The third alternative conclusion that the CPQ Neuroticism score (a self-descriptive measure) is a fairly inadequate measure of mental health status as compared with teacher ratings of adjustment cannot be supported directly by empirical data. Apparently there have not yet been any direct comparisons of the extent of convergence of CPQ Neuroticism and teacher ratings with other measures of psychopathology. However, in view of the available evidence that different types of teacher ratings and scores on diverse personality tests form separate clusters with moderate intercorrelations within clusters and smaller correlations across clusters (e.g., see Ullman, 1952, pp. 33-34), one might note Lambert's (1964) finding that teacher ratings were more highly correlated with clinical evaluations than were pupil's self-descriptions.

A choice between the possible alternative explanations for the low relationship between CPQ Neuroticism scores and teacher ratings can be made only on the basis of future accumulations of data. Both measures should be compared with a generally accepted criterion measure such as clinical ratings or with status on a number of other variables having implications for construct validity (e.g., sociometric status, parents' reports of symptomatic behavior, etc.). Pending the accumulation of such data, the safest compromise position would be to regard teacher ratings as a measure of the school adjustment component of mental health and CPQ Neuroticism scores as a measure of an intrapsychic component of mental health status that reveals itself very little to external observers who do not have a close personal or clinical relationship with the child. Any suggestion that the Neuroticism index should be modified in various ways to predict teacher ratings as a criterion variable (Lessing & Harrod, 1971; Lessing, 1972) must now be considered premature.

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Footnote

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Table 1

Mean CPQ Scores of Well-Adjusted and Maladjusted School Children in Validation Sample

CPQ	factor	Boys			Girls		
		Well-adjusted	Maladjusted		Well-adjusted	Maladjusted	
		N = 96	N = 76	t	N = 141	N = 40	t
A	Outgoing--Reserved	5.9	5.3	2.17*	6.0	4.9	3.26**
B	Intelligent--Dull	7.5	6.3	4.67**	7.3	6.0	4.35**
C	Ego Strength--Weakness	6.5	5.6	3.96**	6.3	5.1	3.94**
D	Excitable--Placid	6.3	6.4	.33	5.6	6.3	1.96[1]
E	Dominant--Submissive	7.4	7.0	1.34	5.4	5.0	1.39
F	Happy-Go-Lucky--Serious	7.0	7.2	.96	5.0	4.4	1.61
G	Conscientious--Frivolous	4.1	3.9	.82	4.7	4.2	1.59
H	Venturesome--Shy	6.4	5.8	2.11*	6.0	5.1	2.30*
I	Sensitive--Tough	3.8	3.9	.44	6.8	6.4	1.32
J	Restrained--Vigorous	5.4	6.2	2.84**	5.7	6.4	2.13*
N	Shrewd--Artless	6.2	6.9	2.34*	5.2	6.2	2.74**
O	Apprehensive--Self-Assured	4.1	5.0	3.47**	4.7	6.0	4.01**
Q_3	Self-Controlled--Lax	4.4	4.1	1.12	5.4	4.6	2.46*

(Table continued on next page.)

Table 1 (continued)

CPQ factor		Boys			Girls		
		Well-adjusted N = 96	Maladjusted N = 76	t	Well-adjusted N = 141	Maladjusted N = 40	t
Q_4	Tense--Relaxed	5.9	5.9	.01	5.8	5.8	.02
	Neuroticism	4.5	4.9	2.69**	5.5	6.1	3.30**

Note.--The higher the mean, the more the group resembles the first-named pole of a given factor.

[1]The *df* for all *t*-tests were adjusted to allow for unequal sample sizes and variances by means of a technique described by Hayes, 1963, p. 322; since *df* for this *t* = 83, $p > .05$.

Table 2

Discriminant Weights to be Used as Multipliers for CPQ Sten Scores Together with Neuroticism Score Weights

CPQ Factor	Discriminant weights		Neuroticism weights[a]
	Boys	Girls	Both sexes
A	.072	-.141	
B	-.367	-.426	
C	-.274	-.225	-.13
D	.043	.173	.07
E	-.075	-.359	-.13
F	.134	-.079	-.13
G	.069	-.127	
H	.049	.020	-.13
I	.088	-.170	.13
J	.136	.004	.07
N	.187	.096	
O	.084	.227	.13
Q_3	.098	-.223	
Q_4	-.018	-.448	.13
Constant to be added	-.507[b]	9.566[b]	5.45[c]

[a]Porter, Cattell and Ford, 1968, p. 15.

[b]Constant will establish zero as cut-off point with positive scores representing maladjustment.

[c]Constant will establish mean at 5.5 so distribution of scores is comparable to that of sten scores on first-order factors.

Table 3

Percentages of Correct Identifications of Well-Adjusted and Maladjusted School Children

Subgroup	N	Percentage of correct identifications produced by: Neuroticism score	Discriminant score	IQ score	Base rate prediction
I Validation sample					
Well-adjusted boys	96	100.0	75.0	72.3	
Maladjusted boys	76	3.9	68.4	64.0	
Total: boys	172	57.6	72.1	68.6	55.8
Well-adjusted girls	141	94.3	77.3	80.4	
Maladjusted girls	40	20.0	70.0	64.1	
Total: girls	181	77.9	75.7	76.8	77.9
Grand total	353	68.0	73.9	72.8	67.1
II Cross-validation sample					
Well-adjusted boys	107	96.3	63.6	64.1	
Maladjusted boys	45	11.1	48.9	66.7	
Total: boys	152	71.0	59.2	64.8	70.4
Well-adjusted girls	129	93.0	76.7	72.1	
Maladjusted girls	14	14.3	35.7	57.1	
Total: girls	143	85.3	72.7	70.6	90.2
Grand total	295	78.0	65.8	67.6	80.0

Table 4

Convergent and Discriminant Validity of CPQ Neuroticism and Discriminant Scores Expressed in Terms of Correlations Between Them and Another Measure of Mental Health Status and Between Them and a Measure of Another Trait

Correlation coefficients[1]	Validation sample		Cross-validation sample
Among measures of mental health[2]			
Neuroticism vs. teacher ratings	.12	(.04)	.22**
Neuroticism vs. discriminant scores	.33**		.45**
Discriminant scores vs. teacher ratings	.63**		.28**
Between measures of mental health and measures of intelligence[3]			
Neuroticism vs. IQ	-.14*	(-.10)	-.17**
Discriminant score vs. IQ	-.50**		-.34**
Teacher ratings vs. IQ	-.52**	(-.38**)	-.50**

Note.--Correlations computed after elimination of pupils rated as having mixed or other problems (including learning difficulties) appear in parentheses.

[1]Values are for product moment correlation coefficients except in case of dichotomized teacher ratings for which biserial r was computed.

[2]N = 353 for validation sample and 295 for cross-validation sample.

[3]N = 346 for validation sample and 281 for cross-validation sample.

*$p < .05$.

**$p < .01$.